ABSTRACT OF THE DISCLOSURE

Long Elements Method (LEM) for real time physically based dynamic simulation of deformable objects. The LEM is based on a new meshing strategy using long elements whose forms can be straight or arbitrary. The LEM implements a static solution for elastic global deformations of objects filled with fluid based on the Pascal's principle and volume conservation. The volumes are discretised in long elements, defining meshes one order of magnitude smaller than meshes based on tetrahedral or cubic elements. The LEM further combines static and dynamic approaches to simulate the same deformable medium, allowing modeling a three-dimensional internal state at any point inside the deforming medium from a reduced number of explicitly updated elements. Complex elastic and plastic deformations can be simulated in real time with less computational effort. The LEM is particularly useful in real time virtual interactions, soft tissue modeling, and graphic and haptic rendering.